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EXAMINER

SALERNO, SARAH KATE

ART UNIT	PAPER NUMBER
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2814

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09/29/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/539,928	Applicant(s) DELEONIBUS, SIMON	
	Examiner SARAH K. SALERNO	Art Unit 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 September 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) 8-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 May 2006 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>05/02/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I claims 1-7 in the reply filed on 09/18/08 is acknowledged.
2. Claims 8-10 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected method, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 09/18/08.

Drawings

3. Figures 1-3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.
4. The drawings are objected to as failing to comply with 37 CFR 1.84(p) (5) because they do not include the following reference sign(s) mentioned in the description: Hardmask (8) on page 17 is not in Figure 5. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should

include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 3-5 recite the limitations "the first extension zones" in claim 3 and "the second extension zones" in claims 4 and 5. There is insufficient antecedent basis for this limitation in the claim their being no mention of first or second extension zones in independent claim 1. Claim 4, depending directly from claim 1, has a second extension zone without having a first extension zone which also needs correction.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-2, 4, and 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rodder (US Patent 6,246,091) in view of Chen et al. (US Patent 6,077,733).

Claim 1: Rodder teaches a self aligned MIS transistor having a source zone (106) and a drain zone (106) on either side of a channel zone (108), as well as a T shaped gate (112) structure comprising a vertical bar located above the channel zone, surmounted by a horizontal bar extending on either side of the vertical bar, said horizontal bar having a lower part, a lateral part and an upper part, the gate structure consisting of a stacking of one or several conductive layers, a base zone of the gate structure being defined as being around the base of the vertical bar of the T, transistor in which the gate structure is coated with a shaping material (114), said material covering the vertical bar of the T, and the part of the horizontal bar of the T, characterized in that said shaping material also covers the base zone of the T shaped structure (FIG. 3H).

Rodder does not teach the shaping material covering the lateral part of the horizontal bar of the T. Chen teaches the shaping material covering the lateral part of the horizontal bar of the T to reduce the parasitic resistance for a T-shaped gate structure with reduced dimensions (FIG. 3e-f; Col. 4 lines 35-40). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the shaping material taught by Rodder to cover the lateral part of the horizontal bar to reduce the parasitic resistance for a T-shaped gate structure with reduced dimensions as taught by Chen (FIG. 3e-f; Col. 4 lines 35-40).

Claim 2: Rodder teaches the base zone covered by the shaping material extends above the source and drain zones (FIG. 3H).

Claim 4: Rodder teaches the second extension zones (105) between the channel and source and drain zones respectively have a doping of nature opposite to that of the source and drain zones.

Claim 6: Chen teaches the shaping material is of silicon nitride (Si_3N_4) or hafnium oxide (HfO_2) or zirconium oxide (ZrO_2) or aluminum oxide (Al_2O_3) (Col. 5-6).

Claim 7: Rodder teaches the stacking of layers constituting the gate structure lodged in the shaping material is intrinsic polysilicon or a metal (Col. 5).

Claim 8: Rodder teaches a method for manufacturing, on a semiconductor substrate (102), at least one self aligned MIS transistor (100) having a source zone (106) and a drain zone (106) on either side of a channel zone (180), as well as a T shaped gate structure (112) of low resistivity comprising a vertical bar located above the channel zone, surmounted by a horizontal bar extending on either side of the vertical bar, said horizontal bar having a lower part, a lateral part and an upper part, the gate structure consisting of a stacking of one or several conductive layers, a base zone of the gate structure being defined as being around the base of the vertical bar of the T, the method comprising a step of forming a solid shape having the T shape of the grid that one wishes to form, and the coating of said shape in a shaping material (114), said shaping material coating the lateral surface of the vertical bar (6) of the T, the lower surface of the horizontal bar of the T, characterized in that said shaping material also covers the base zone of the definitive gate structure (FIG. 3H).

Rodder does not teach the shaping material covering the lateral part of the horizontal bar of the T. Chen teaches the shaping material coating the lateral part of the horizontal bar of the T to reduce the parasitic resistance for a T-shaped gate structure with reduced dimensions (FIG. 3e-f; Col. 4 lines 35-40). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the shaping material taught by Rodder to coat the lateral part of the horizontal bar to reduce the parasitic resistance for a T-shaped gate structure with reduced dimensions as taught by Chen (FIG. 3e-f; Col. 4 lines 35-40).

Claim 9: Rodder teaches the shaping material covers a part at least of the source and drain zones (FIG. 3H).

Claim 10: Chen teaches the shaping material is silicon nitride (Si_3N_4) or hafnium oxide (HfO_2) or zirconium oxide (ZrO_2) or aluminum oxide (Al_2O_3) (Col. 5-6).

9. Claims 3 & 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rodder (US Patent 6,246,091) and Chen et al. (US Patent 6,077,733), as applied to claim 1 above, and further in view of Noguchi et al. (US Patent 6,323,525).

Regarding claim 3, as described above, Rodder and Chen substantially read on the invention as claimed, and Rodder teaches the first extension zones (104) between the channel and source and drain zones respectively have a doping of the same nature as the source and drain zones (Col. 6). Rodder and Chen do not teach the first extension zones being a weaker concentration than the source and drain zones. Noguchi teaches the first extension zones (14) being a weaker concentration than the

Art Unit: 2814

source and drain zones to improve device performance (Col. 4 lines 44-47; FIG. 11, 14).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the first extension zones taught by Rodder to be a weaker concentration than the source and drain regions to improve device performance as taught by Noguchi (Col. 4 lines 44-47; FIG. 11, 14).

Claim 5: Rodder teaches the second extension zones (105) between the first extension zones (104) and the channel zone have respectively a doping of nature opposite to that of the source and drain zones (Col. 6).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SARAH K. SALERNO whose telephone number is (571)270-1266. The examiner can normally be reached on M-F 8:00-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. K. S./
Examiner, Art Unit 2814

/Theresa T. Doan/
Primary Examiner, Art Unit 2814